BlueBoard-LPC1114

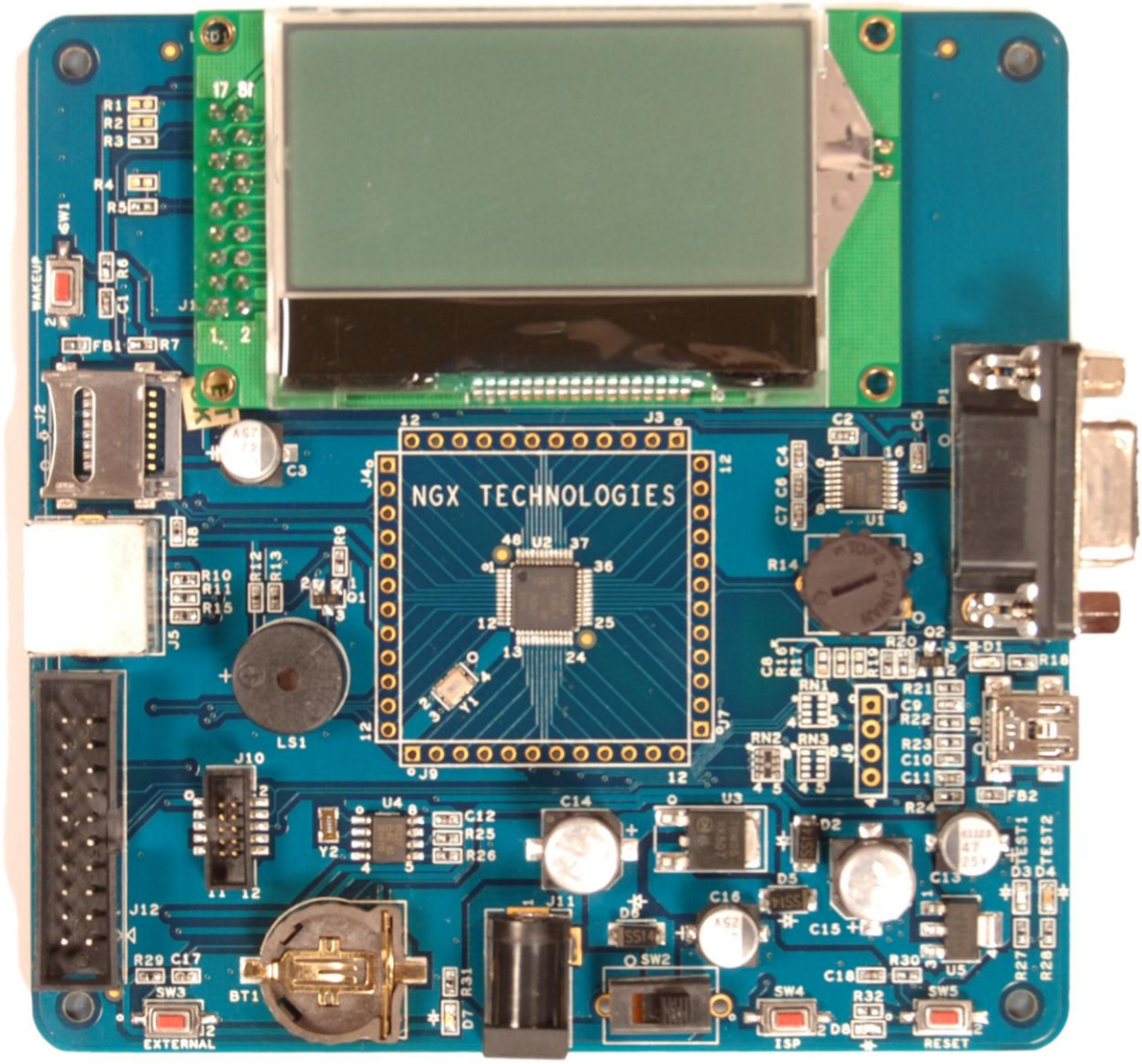

Fig. 1

About NGX Technologies

NGX Technologies is a premier supplier of development tools for the ARM7, ARM Cortex M0, M3 and M4 series of microcontrollers. NGX provides innovative and cost effective design solutions for embedded systems. We specialize in ARM MCU portfolio, which includes ARM7, Cortex-M0, M3 & M4 microcontrollers. Our experience with developing evaluation platforms for NXP controller enables us to provide solutions with shortened development time thereby ensuring reduced time to market and lower development costs for our customers. Our cost effective and feature rich development tool offering, serves as a testimony for our expertise, cost effectiveness and quality.

Contact Information:

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No.216, 5th main Road, R.P.C. Layout,
Vijayanagar 2nd Stage,
Bangalore – 560 104
Phone : +91-80-40925507
email:sales@ngxtechnologies.com

CE certification

NGX Technologies BLUEBOARD-LPC1114 board have been tested for radiated emission as per EN55022 class A standard. The device is under the limits of the standard EN55022 class A and hence CE marked. No other test have been conducted other than the radiated emission (EN55022 class A standard). The device was tested with the ports like USB, Serial, and Power excluding the GPIO ports. Any external connection made to the GPIO ports may alter the EMC behaviour. Usage of this device under domestic environment may cause unwanted interference with other electronic equipment's. User is expected to take adequate measures. The device is not intended to be used in and end product or any subsystem unless the user re-evaluates applicable directive/conformance.

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1.0 INTRODUCTION

This document is the User Manual for the BLUEBOARD-LPC1114, a low cost ARM Cortex-M0 based board by NGX Technologies. This document reflects its contents which include system setup, debugging, and software components. This document provides detailed information on the overall design and usage of the board from a systems perspective.

Before proceeding further please refer the quick start guide for BLUEBOARD-LPC1114 features and BLUEBOARD-LPC1114 verification.

For BLUEBOARD-LPC1114 quick start guide Click here.

For the most updated information on the BLUEBOARD-LPC1114 board please refer to NGX' website.

2.0 BLUEBOARD-LPC1114 Development Tool Setup

2.1 IDE and debugger

As mentioned in the earlier section, NGX's MCU evaluation platforms are not coupled tightly with any one particular combination of IDE and debugger. The following sections will explain the setup for CoIDE and NGX CoLink as the IDE and debugger respectively.

2.2 Installation & Configuration of CoIDE software

The Installation of CoIDE software is explained below:

*Note: We have used CoIDE **1.4.2** while creating the User manual for this evaluation kit. Please ensure that you are using version 1.4.2 and above.*

Step 1: Open CoIDE 1.4.2 setup

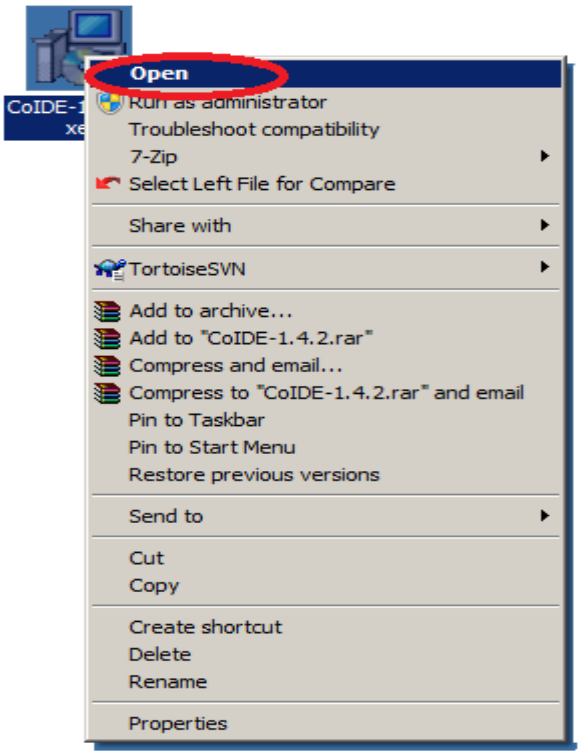

Fig. 2

Step 2: CoIDE 1.4.2 information Click on Next

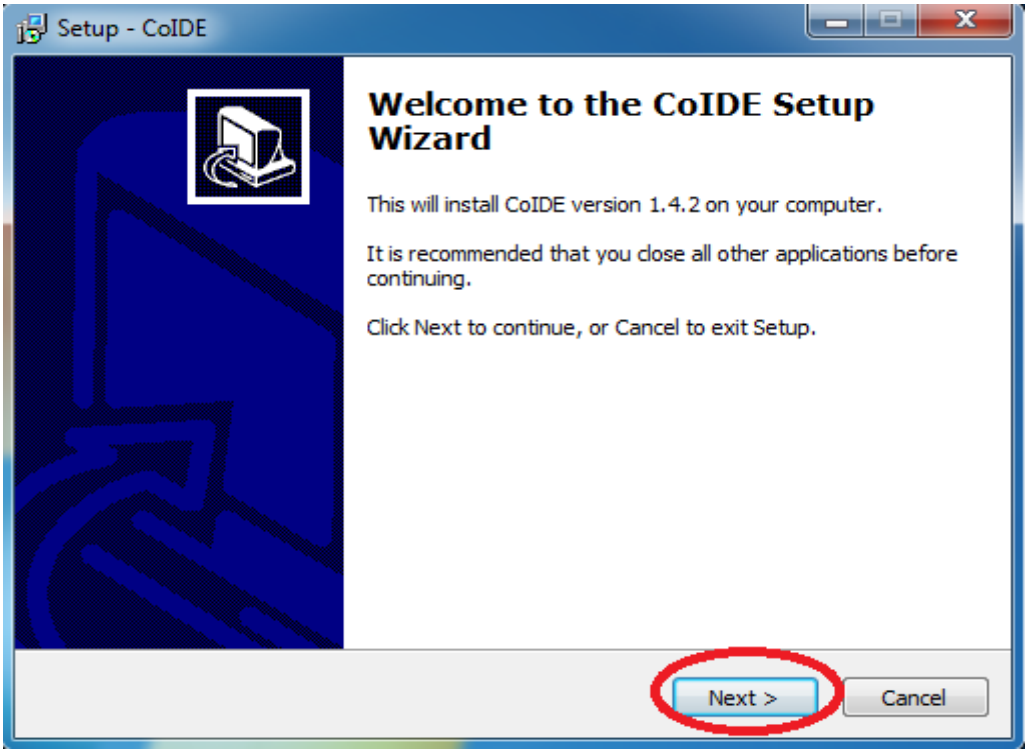
Setup - CoIDE
Welcome to the CoIDE Setup Wizard
This will install CoIDE version 1.4.2 on your computer.
It is recommended that you close all other applications before continuing.
Click Next to continue, or Cancel to exit Setup.
Next >
Cancel

Fig. 3

Step 3: Provide the destination path as shown in the below image and Click on Next.

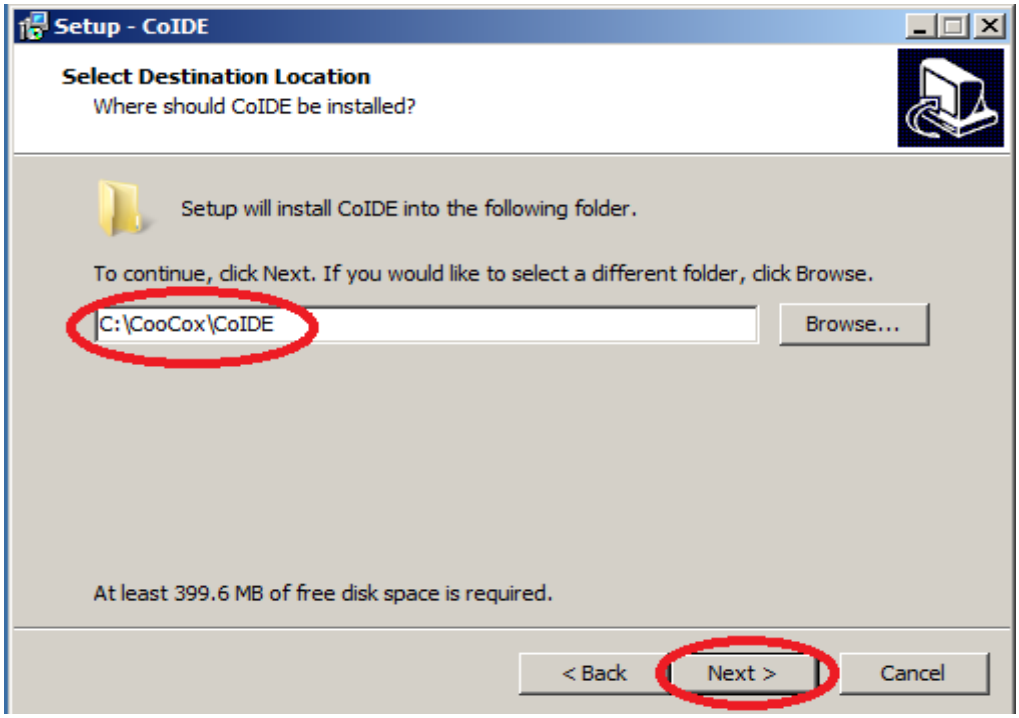
Setup - CoIDE
Select Destination Location
Where should CoIDE be installed?
Setup will install CoIDE into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\CooCox\CoIDE
Browse...
At least 399.6 MB of free disk space is required.
< Back
Next >
Cancel

Fig. 4

Step 4: Click on Next.

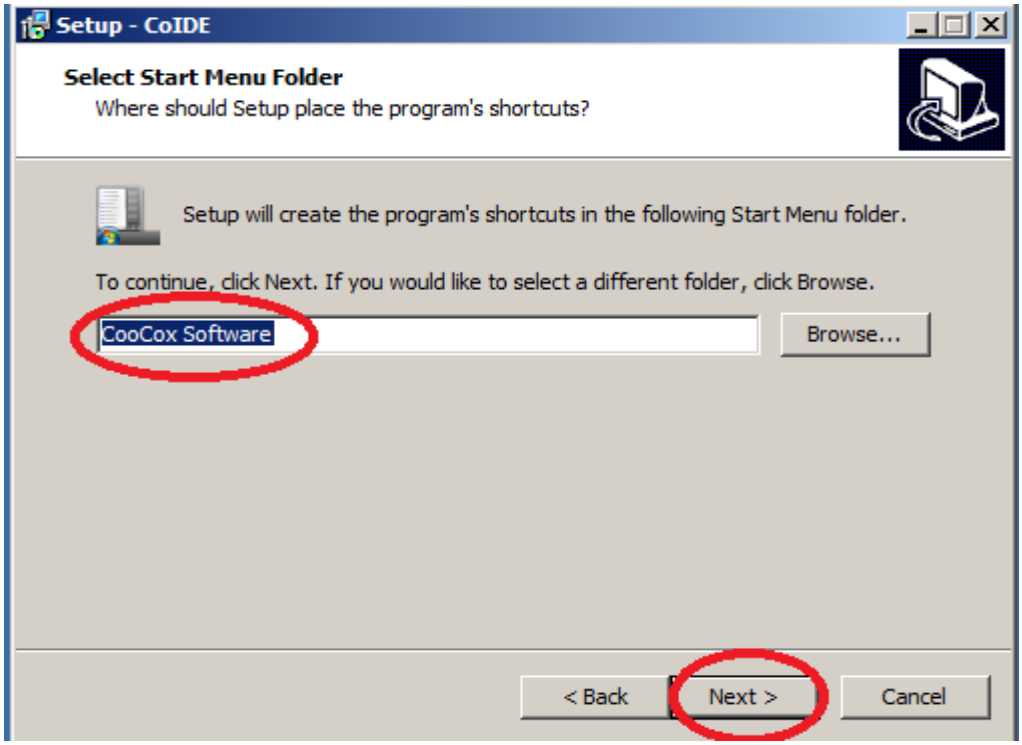
Setup - CoIDE
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
CooCox Software
Browse...
< Back
Next >
Cancel

Fig. 5

Step 5**:** Click on Install.

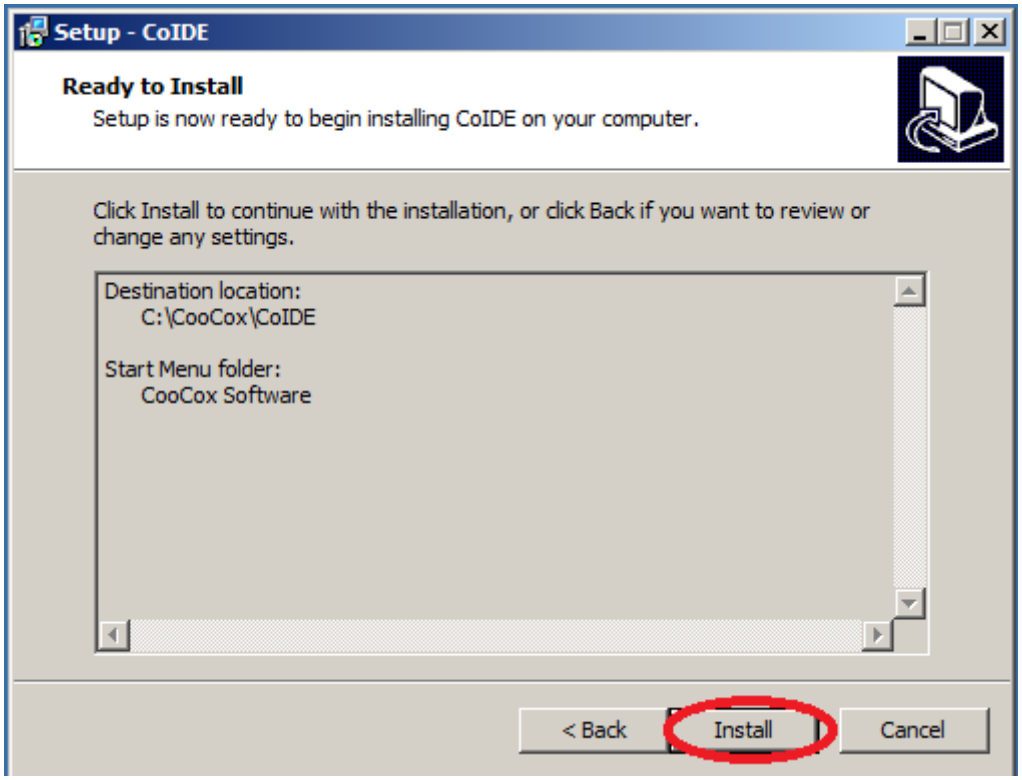
Setup - CoIDE
Ready to Install
Setup is now ready to begin installing CoIDE on your computer.
Click Install to continue with the installation, or click Back if you want to review or change any settings.
Destination location:
C:\CooCox\CoIDE
Start Menu folder:
CooCox Software
< Back
Install
Cancel

Fig. 6

Step 6: Click on Finish.

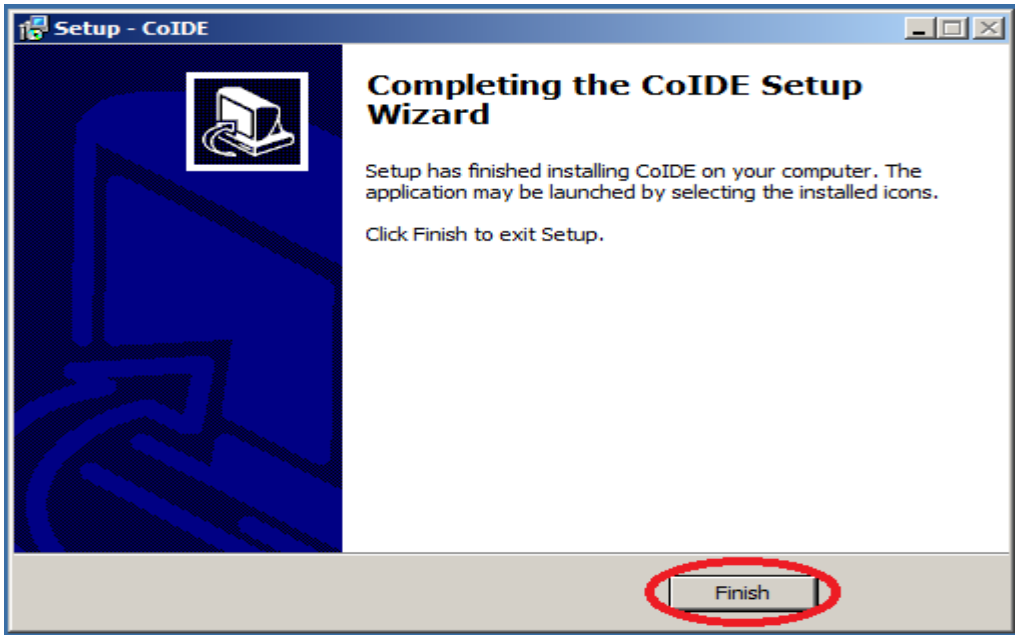
Setup - CoIDE
Completing the CoIDE Setup Wizard
Setup has finished installing CoIDE on your computer. The application may be launched by selecting the installed icons.
Click Finish to exit Setup.
Finish

Fig. 7

2.3 Setup for NGX CoLink and BLUEBOARD-LPC1114 Board

The BlueBoard-LPC1114 board has on board 10 pin SWD box, the NGX CoLink is not part of the BlueBoard-LPC1114 package, needs to buy it separately.

To run the BlueBoard-LPC1114 examples you will need the following and the image shows the each components:

- NGX CoLink.
- BlueBoard-LPC1114 Board.
- Mini USB cable.

NGX CoLink with cable as shown in below image.

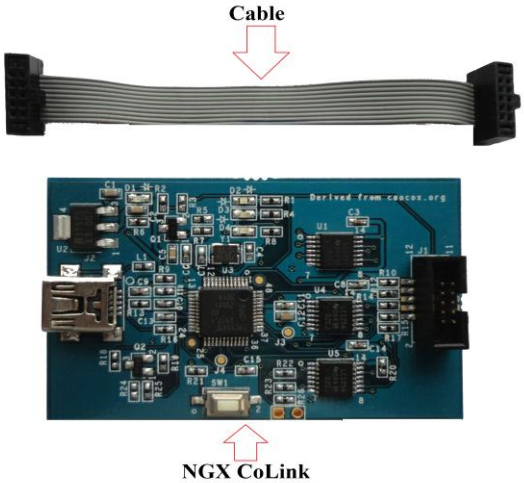

Fig. 8

Connections of components are shown in the below image.

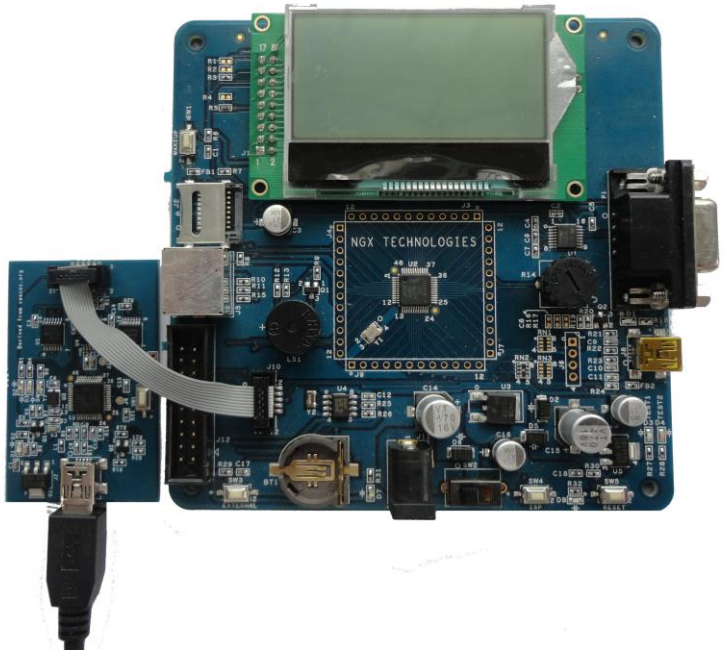

Fig. 9

The above setup is ready to use for development in CoIDE IDE.

2.4 Configuration of NGX CoLink Debugger

The configuration flow of NGX CoLinkEx Debugger is explained below:

Before configuring the NGX CoLink select the tool chain path as **C:\CooCox\CoIDE\gcc\Sourcery G++ Lite\bin** as shown in the below images.

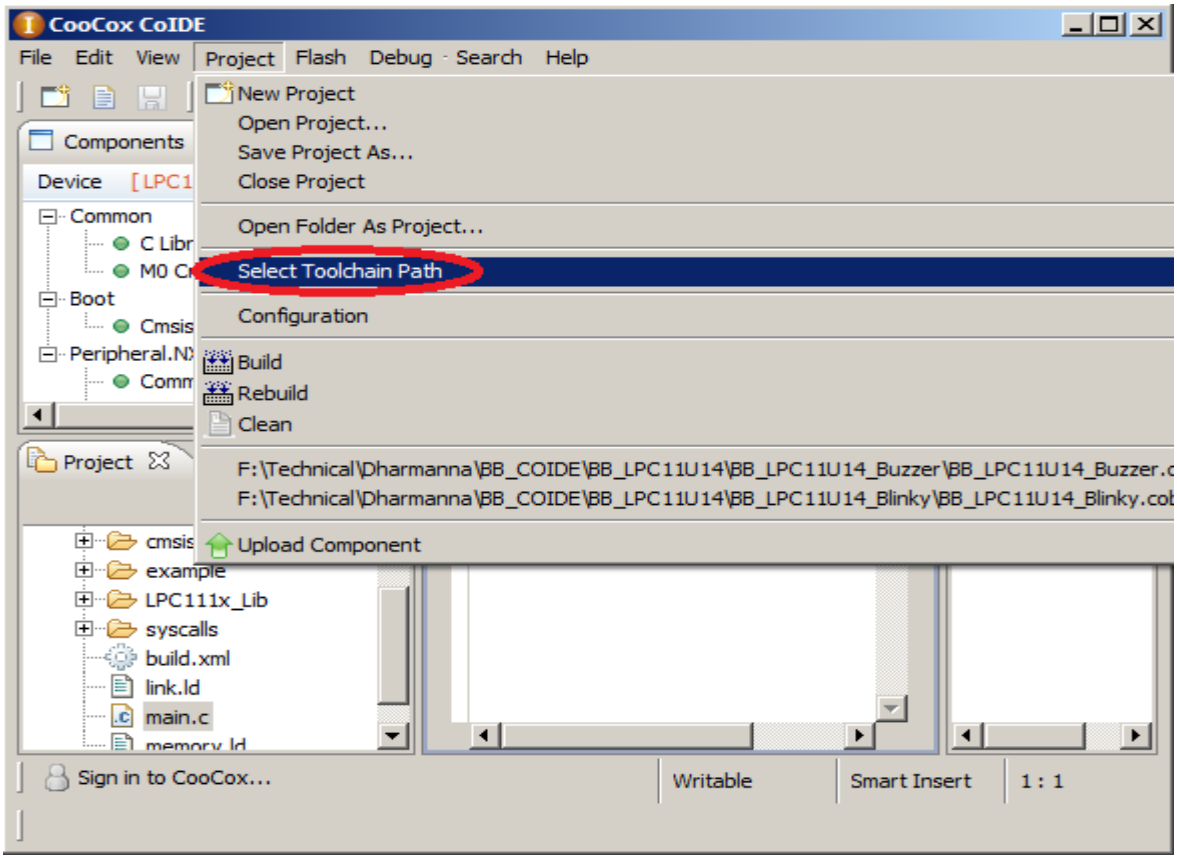
CooCox CoIDE
File Edit View Project Flash Debug Search Help
New Project
Open Project...
Save Project As...
Close Project
Open Folder As Project...
Select Toolchain Path
Configuration
Build
Rebuild
Clean
F:\Technical\Dharmanna\BB_COIDE\BB_LPC11U14\BB_LPC11U14_Buzzer\BB_LPC11U14_Buzzer.c
F:\Technical\Dharmanna\BB_COIDE\BB_LPC11U14\BB_LPC11U14_Blinky\BB_LPC11U14_Blinky.cob
Upload Component
Components
Device [LPC1
Common
Boot
Peripheral.NX
Project
cmsis
example
LPC111x_Lib
syscalls
build.xml
link.ld
main.c
Sign in to CooCox...
Writable
Smart Insert
1 : 1

Fig. 10

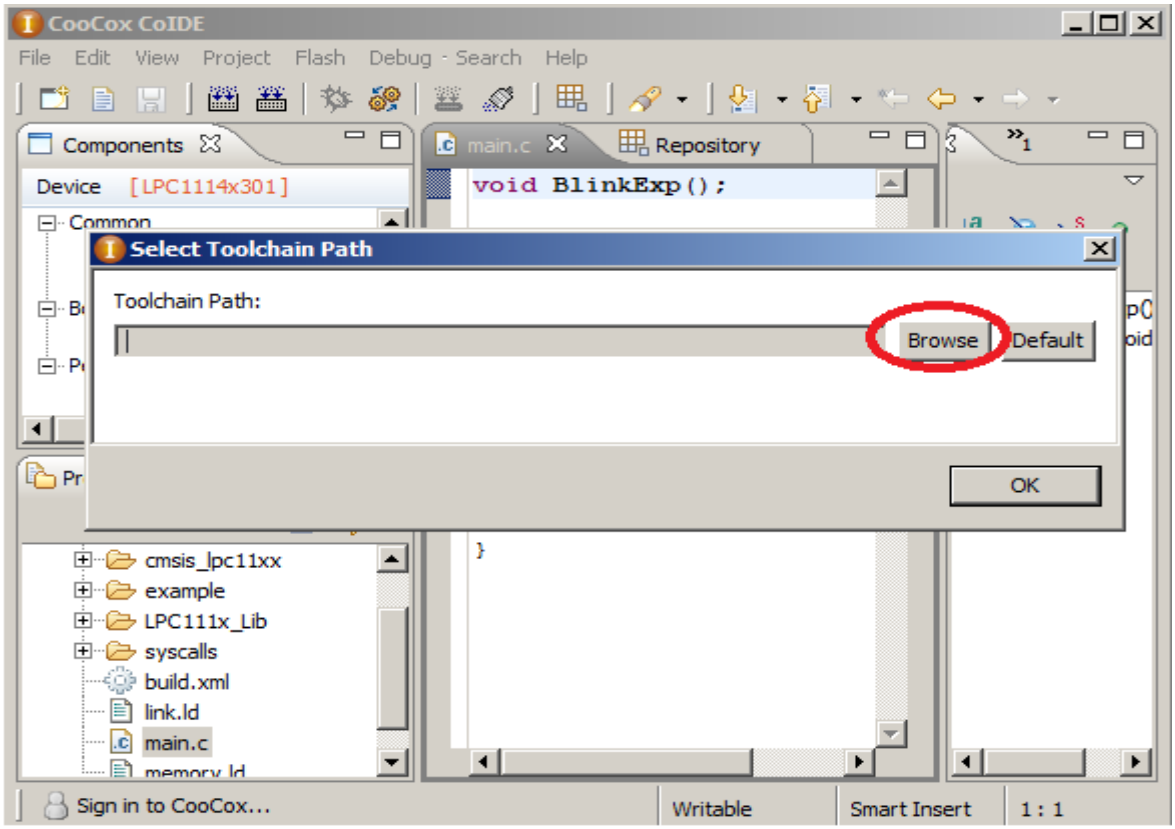
CooCox CoIDE
File Edit View Project Flash Debug Search Help
Components
Device [LPC1114x301]
Common
main.c
Repository
void BlinkExp();
Select Toolchain Path
Toolchain Path:
Browse
Default
OK
}
cmsis_lpc11xx
example
LPC111x_Lib
syscalls
build.xml
link.ld
main.c
Sign in to CooCox...
Writable
Smart Insert
1 : 1

Fig. 11

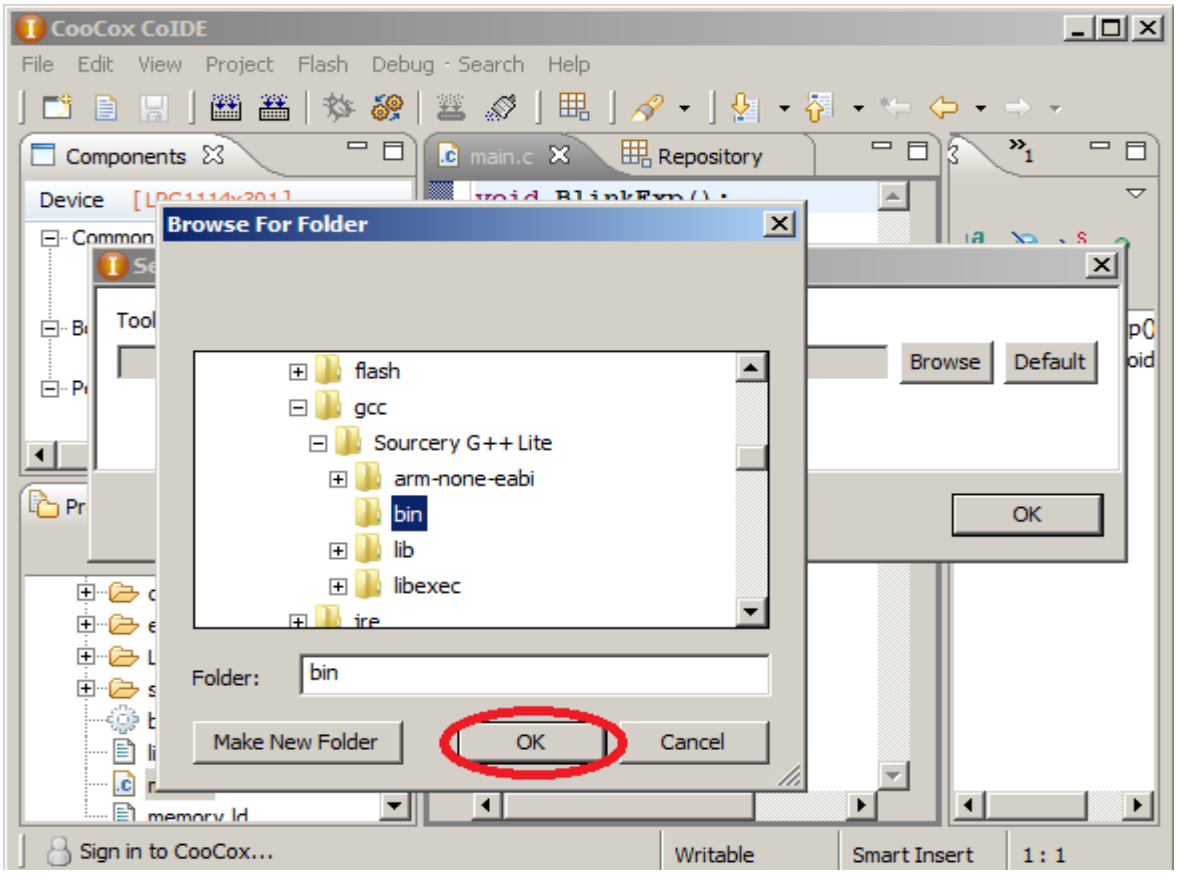
CooCox CoIDE
File Edit View Project Flash Debug Search Help
Components
main.c
Repository
Device
Browse For Folder
flash
gcc
Sourcery G++ Lite
arm-none-eabi
bin
lib
libexec
Folder:
bin
Make New Folder
OK
Cancel
Browse
Default
OK
Sign in to CooCox...
Writable
Smart Insert
1 : 1

Fig. 12

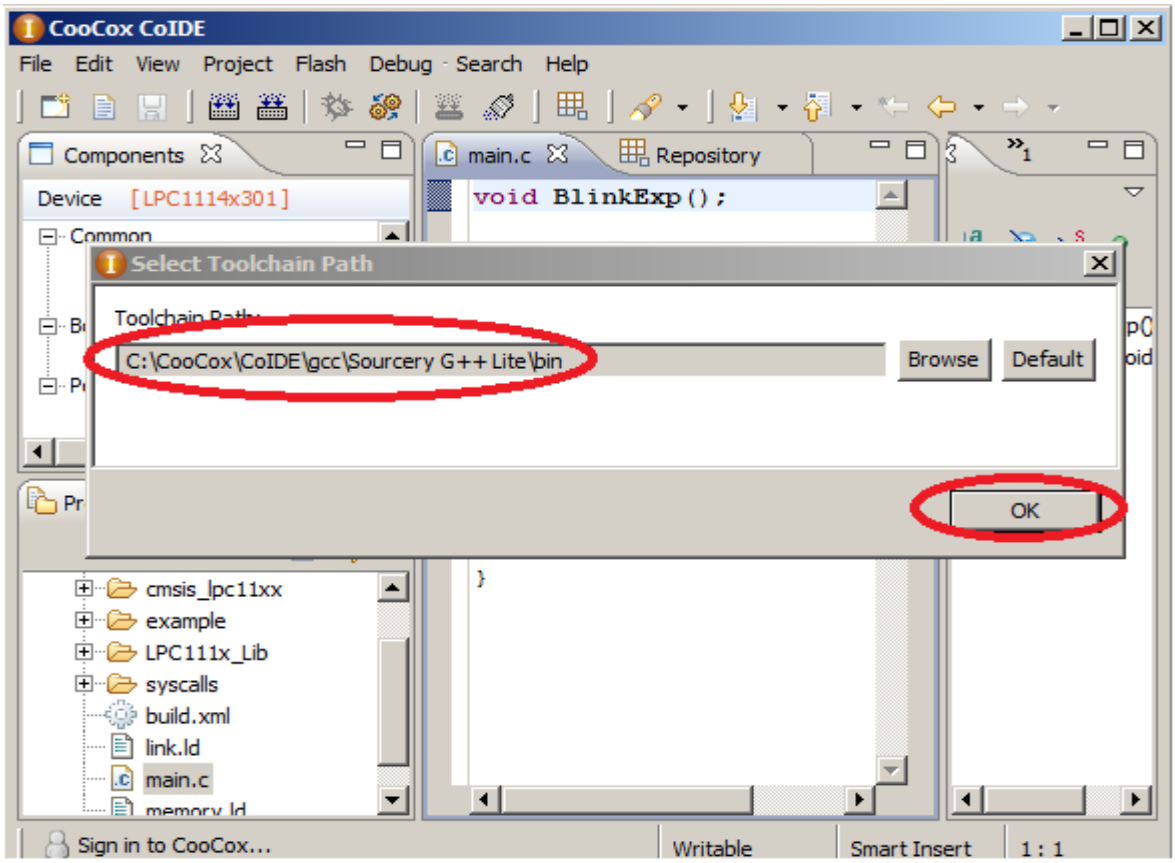
CooCox CoIDE
File Edit View Project Flash Debug Search Help
Components
main.c
Repository
Device
[LPC1114x301]
void BlinkExp();
Select Toolchain Path
Toolchain Path:
C:\CooCox\CoIDE\gcc\Sourcery G++ Lite\bin
Browse
Default
OK
cmsis_lpc11xx
example
LPC111x_Lib
syscalls
build.xml
link.ld
main.c
Sign in to CooCox...
Writable
Smart Insert
1 : 1

Fig. 13

Step 1: Open CoIDE project for example: BB_LPC1114_Blinky then click on Debug Configuration as shown in the below image.

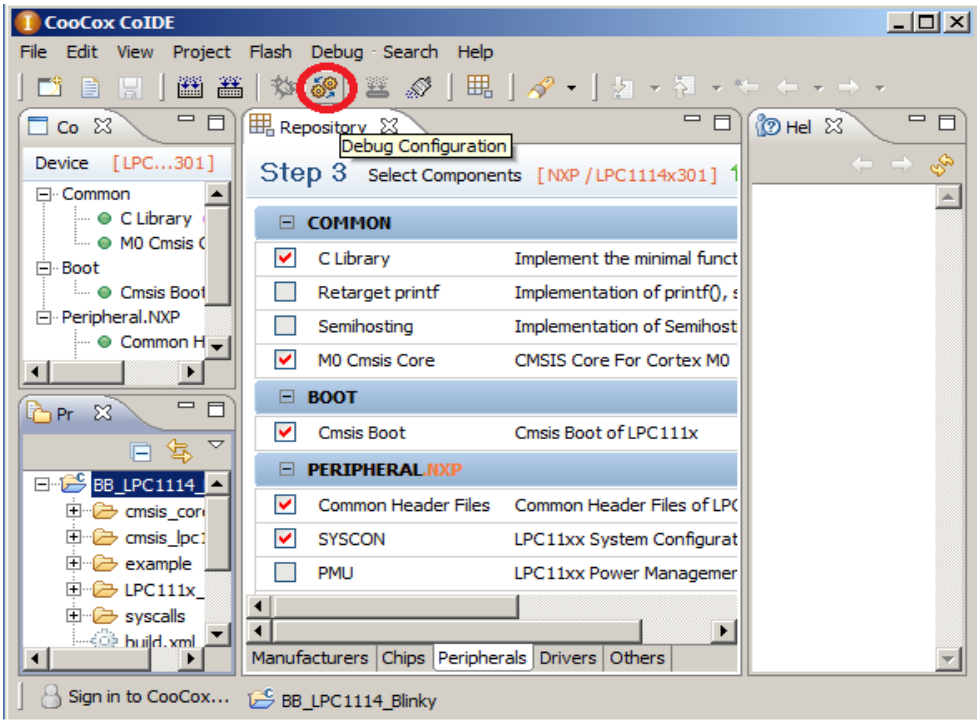
CooCox CoIDE
File Edit View Project Flash Debug Search Help
Debug Configuration
Repository
Step 3 Select Components [NXP / LPC1114x301]
COMMON
C Library Implement the minimal funct
Retarget printf Implementation of printf(),
Semihosting Implementation of Semihost
M0 Cmsis Core CMSIS Core For Cortex M0
BOOT
Cmsis Boot Cmsis Boot of LPC111x
PERIPHERAL NXP
Common Header Files Common Header Files of LP
SYSCON LPC11xx System Configurat
PMU LPC11xx Power Managemer
Manufacturers Chips Peripherals Drivers Others
Sign in to CooCox...
BB_LPC1114_Blinky

Fig. 14

Step 2: Click on Example: BB_LPC1114_Blinky.configuration then select ColinkEx adapter, select SWD port and 1M Max Clock(Hz) as shown in the below image.

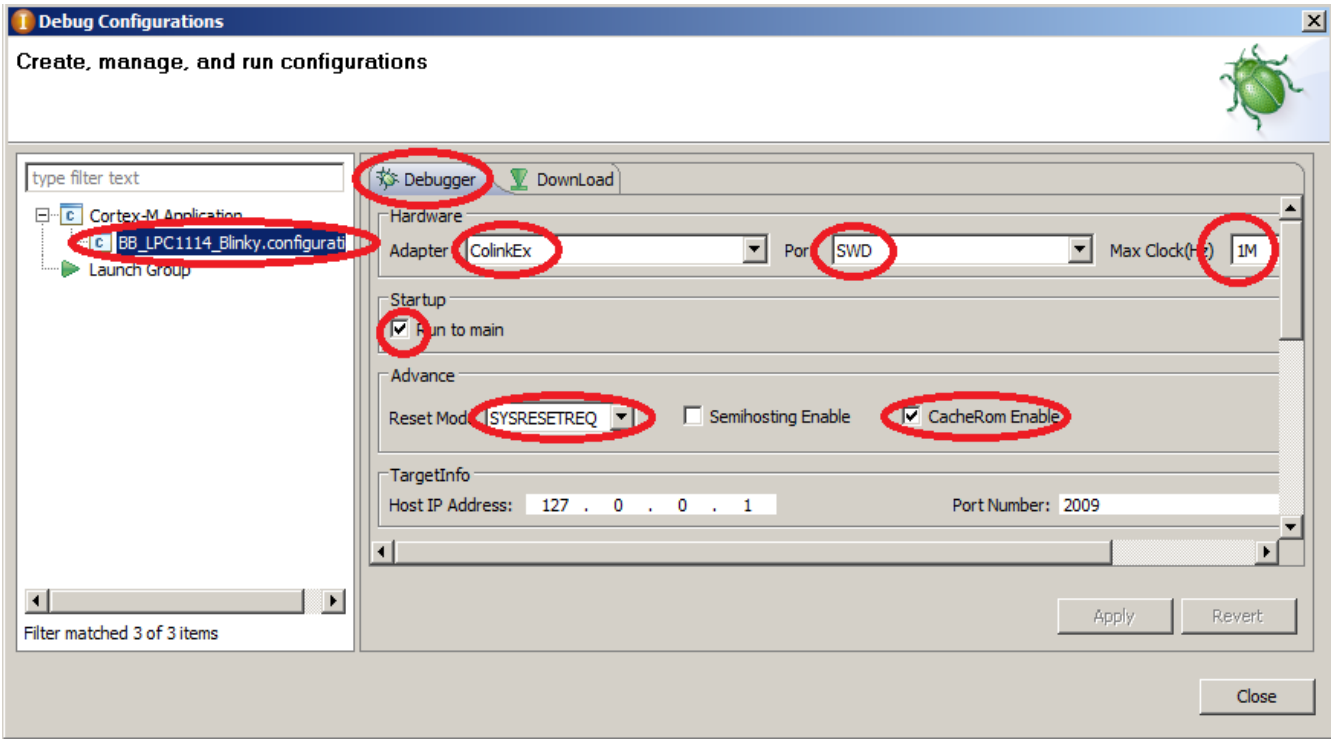

Fig. 15

Step 3: Select Download option then click on default and apply then click on close as shown in below image.

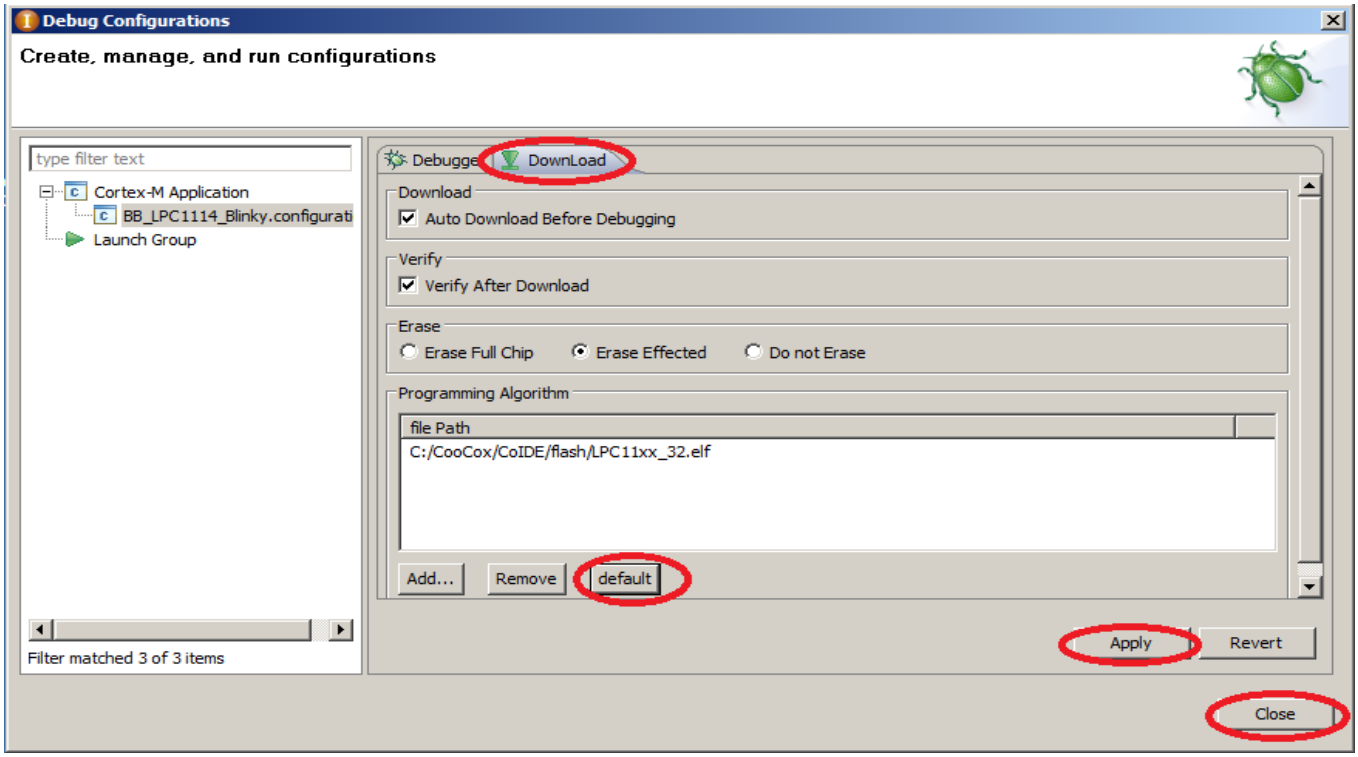

Fig. 16

3.0 BLUEBOARD-LPC1114 Software Development

3.1 Executing the sample projects

The sample projects are provided with the available kit.

Steps to execute the sample projects:

1. Open the project folder.
2. Then open the file project_name.cob eg BB_LPC1114_Blinky.cob as shown in below image.

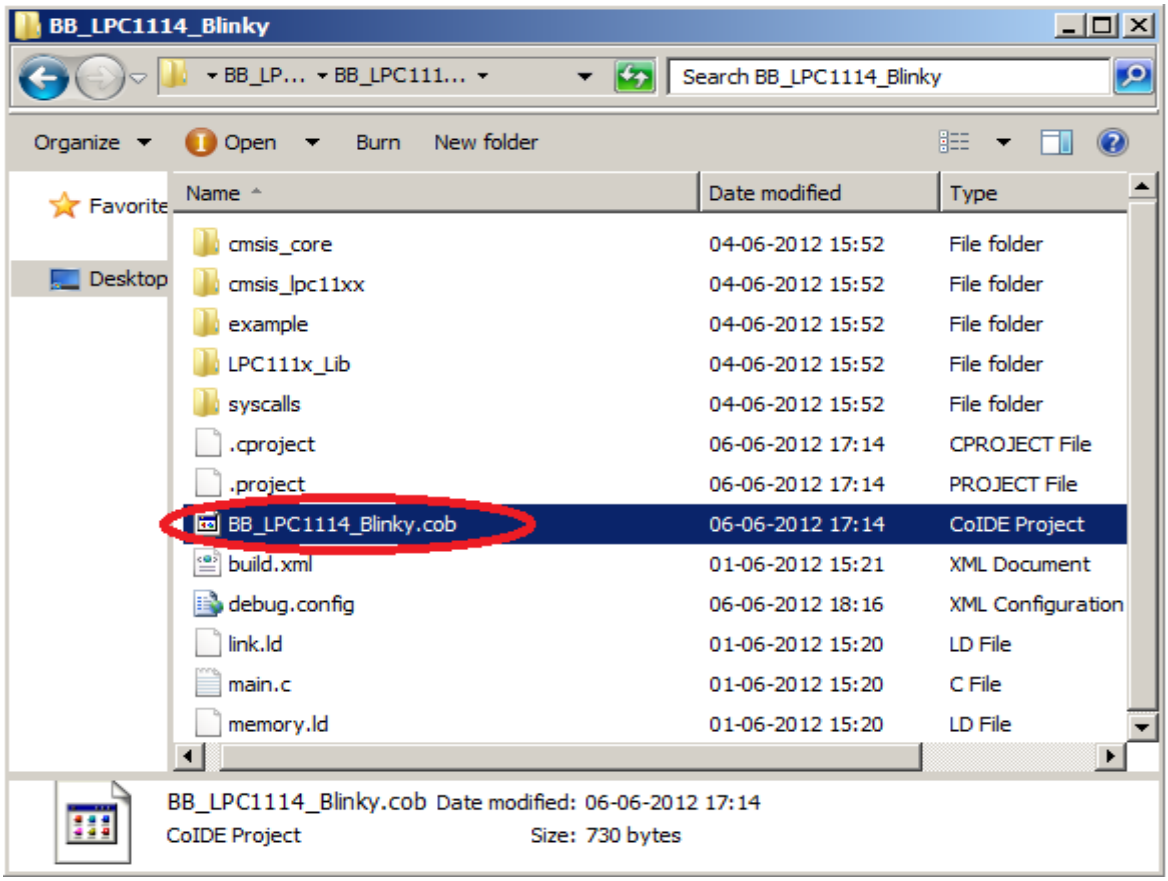

Fig. 17

3. This launches the IDE

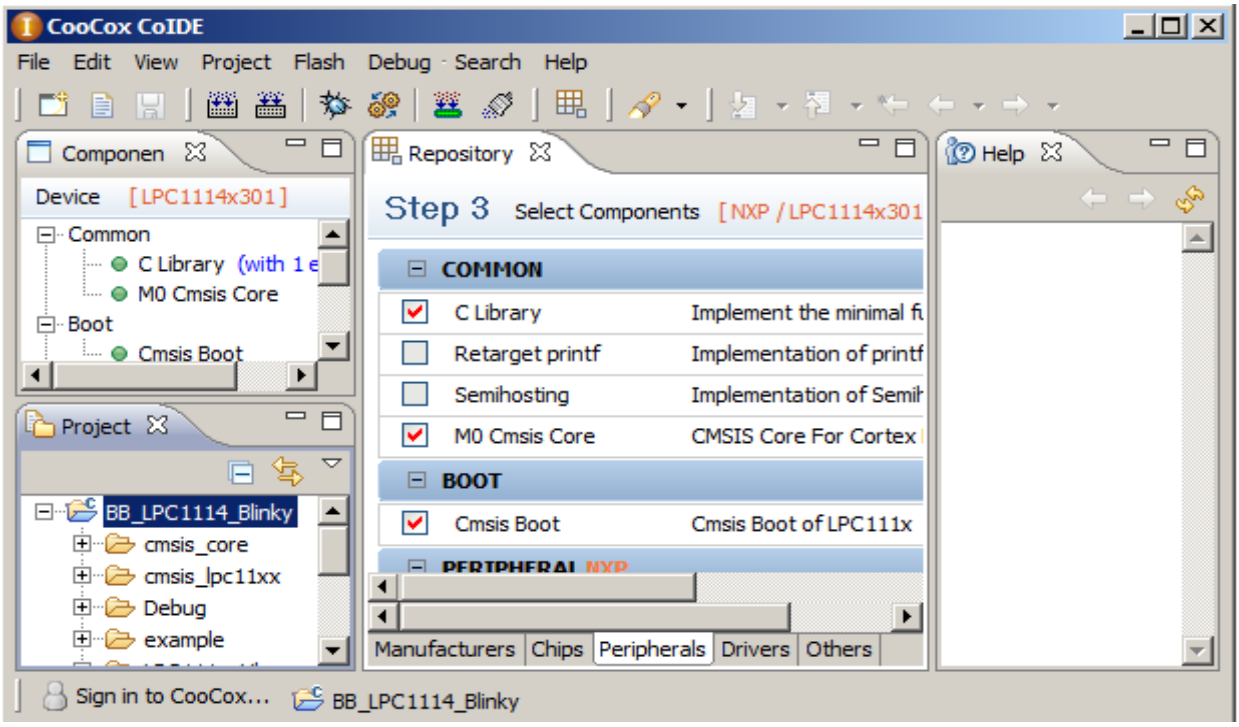

Fig. 18

4. Build the project as shown below image.

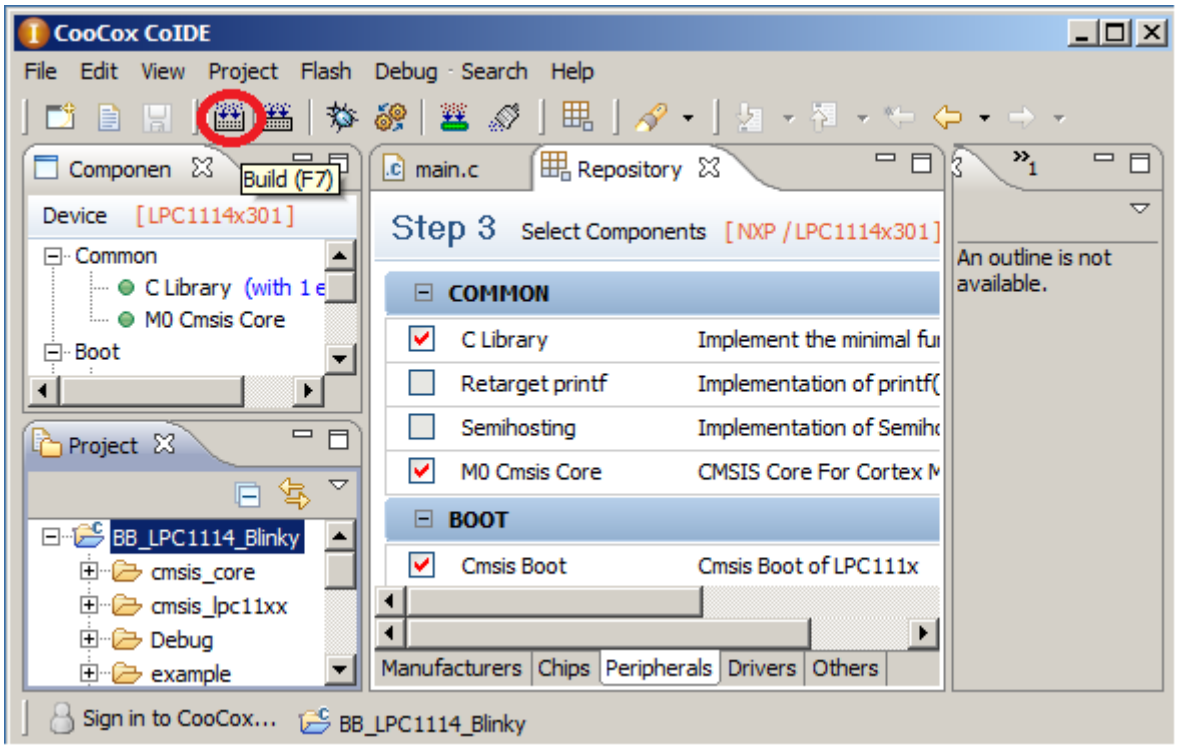

Fig. 19

5. Click on Debug button on the IDE and the project is loaded onto the controller and ready for debugging as shown in below image.

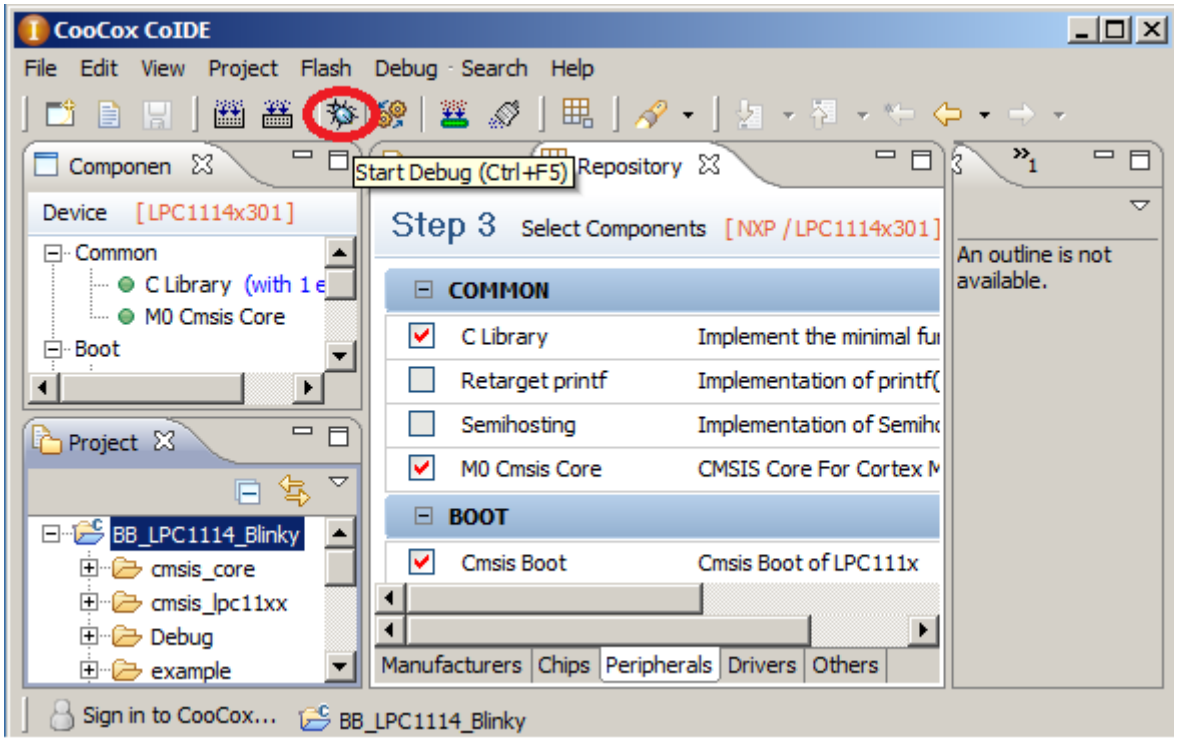

Fig. 20

3.2 Creating New project

Follow the below steps, for creating new project:

Step 1: After launching CooCox CoIDE, select manufacturer, for example: NXP as shown in image,

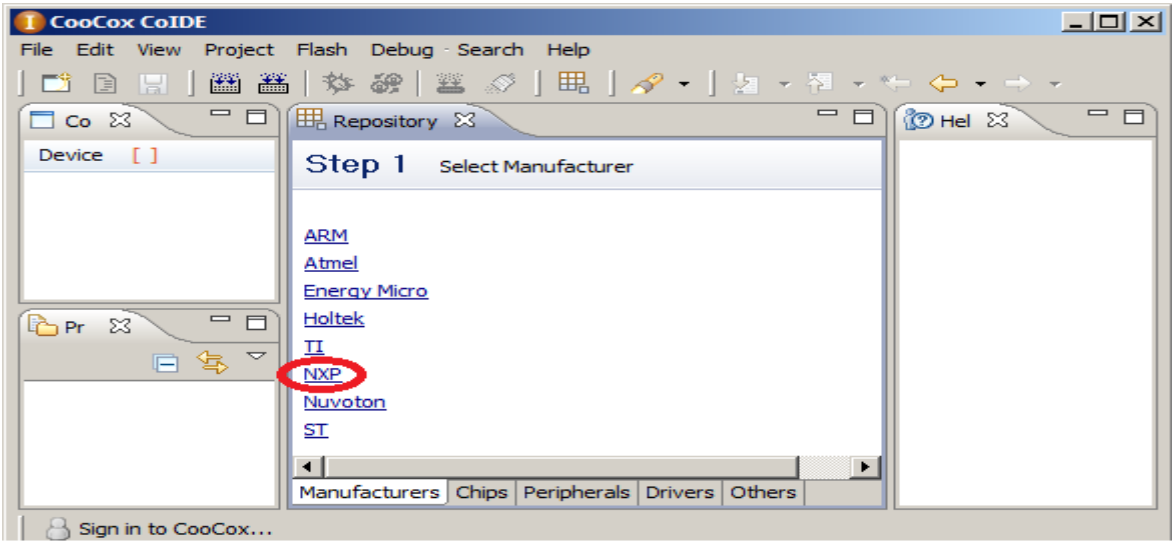

Fig. 21

Step 2: Select chip, for example:LPC1114x301, the right side of CoIDE will display the corresponding information of the chip as shown in below image.

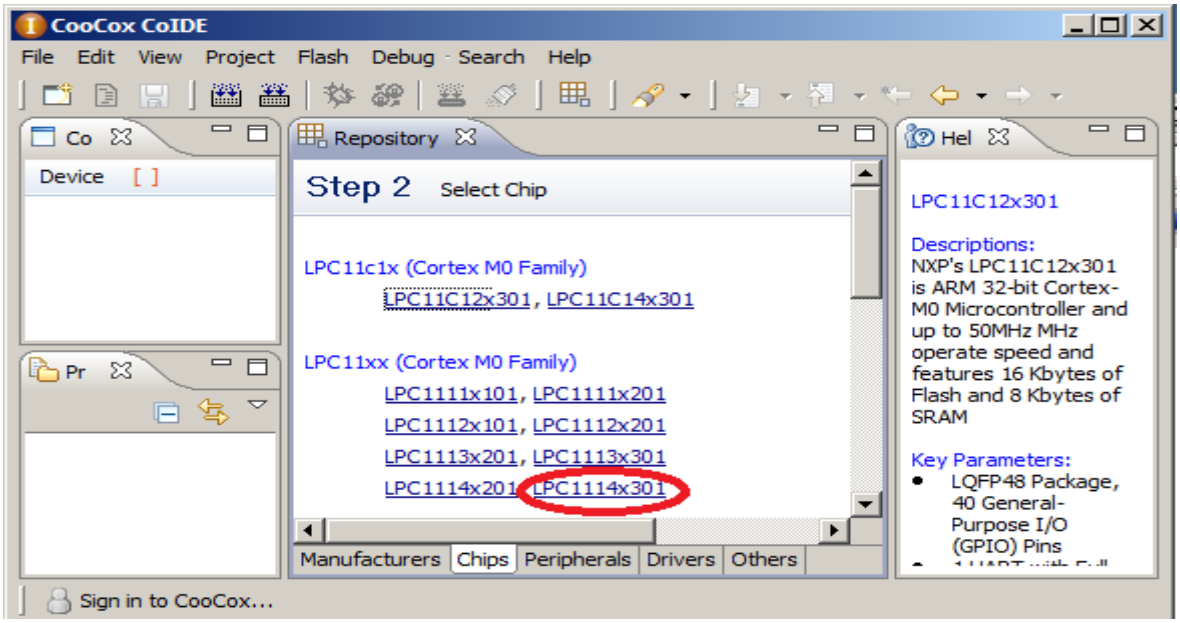

Fig. 22

Step 3: Check the components which you want to use, for example, check GPIO component. CoIDE will promote you to create a new project as shown in below image.

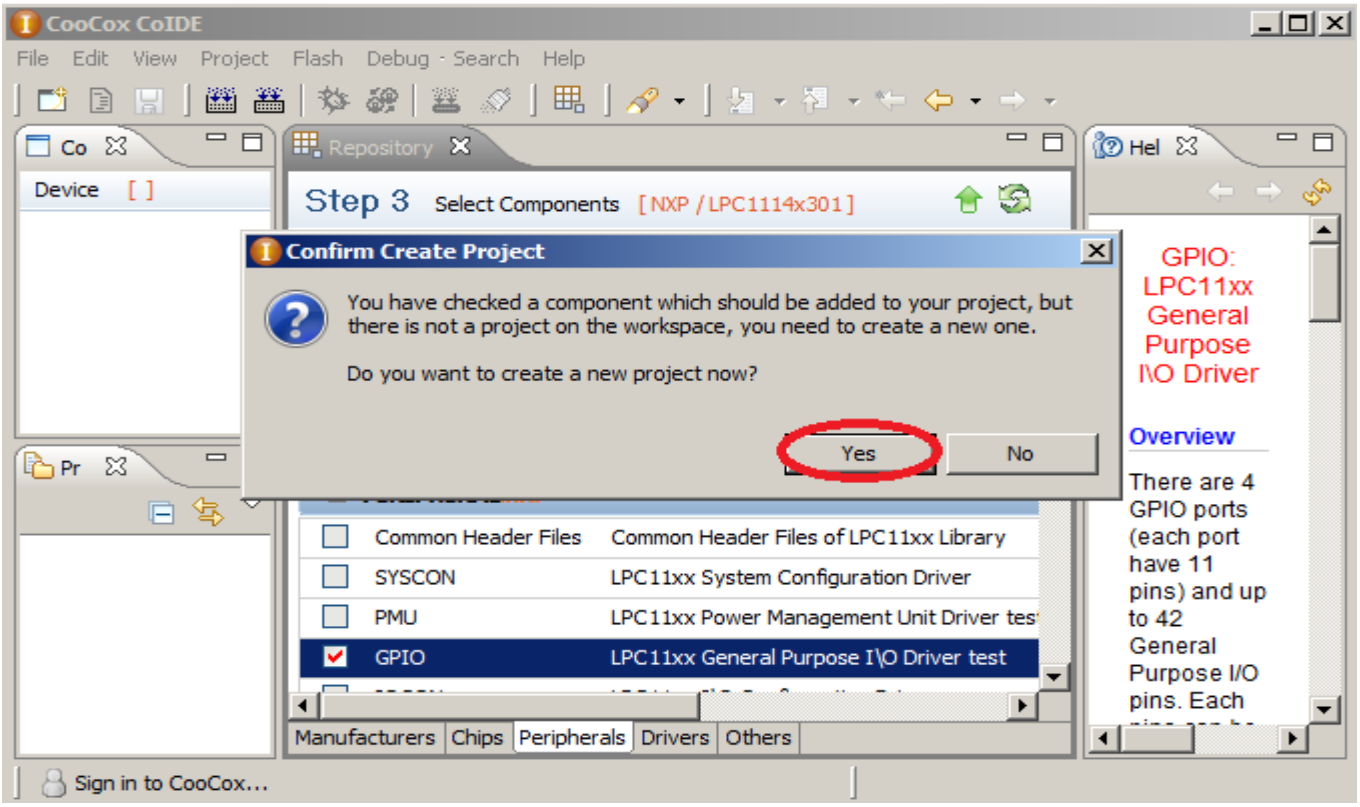
CooCox CoIDE
File Edit View Project Flash Debug Search Help
Repository
Step 3 Select Components [NXP / LPC1114x301]
Confirm Create Project
You have checked a component which should be added to your project, but there is not a project on the workspace, you need to create a new one.
Do you want to create a new project now?
Yes
No
Common Header Files
Common Header Files of LPC11xx Library
SYSCON
LPC11xx System Configuration Driver
PMU
LPC11xx Power Management Unit Driver test
GPIO
LPC11xx General Purpose I\O Driver test
Manufacturers Chips Peripherals Drivers Others
GPIO: LPC11xx General Purpose I\O Driver
Overview
There are 4 GPIO ports (each port have 11 pins) and up to 42 General Purpose I/O pins. Each
Sign in to CooCox...

Fig. 23

Step 4: Input the project's name, CoIDE will create a project contained startup code and main.c file for you. The components you selected in third step will be added to your project, too as shown in image.

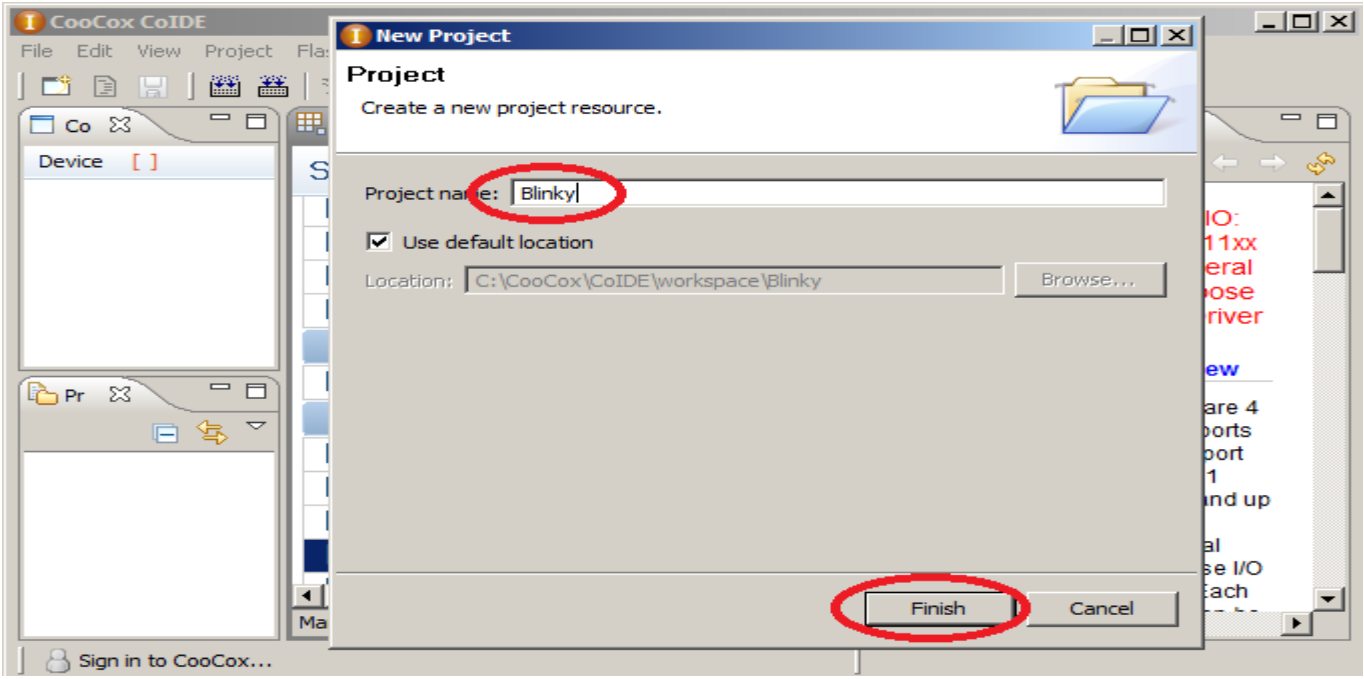

Fig. 24

Step 5: Start writing your code in main as shown in below image.

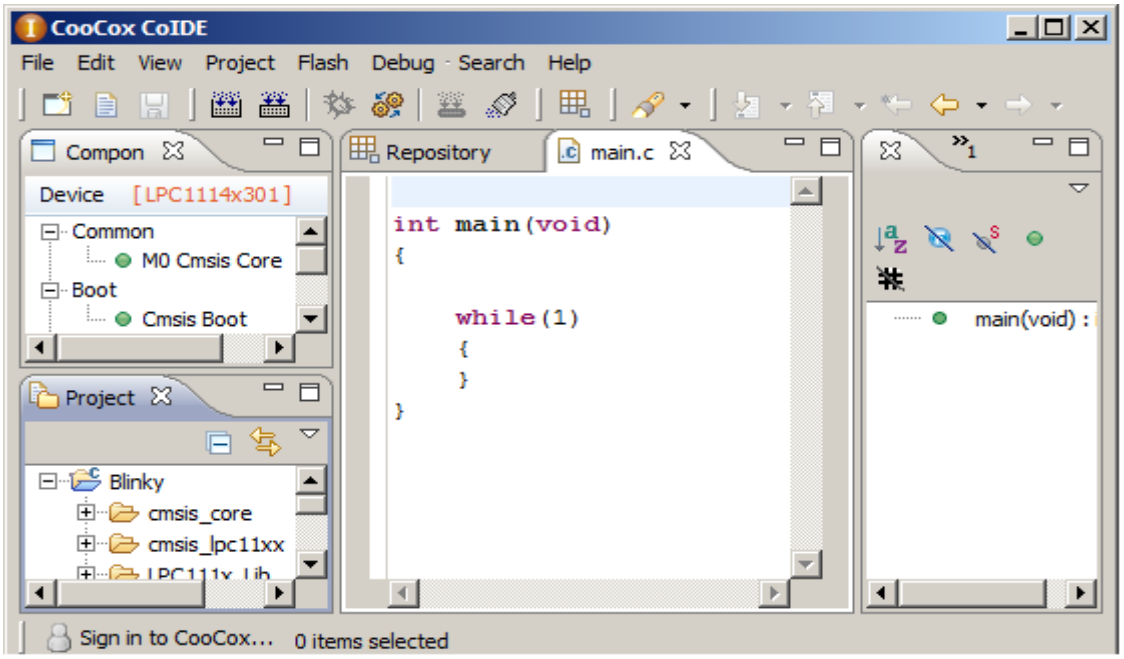

Fig. 25

Step 6: Build the project as shown below image.

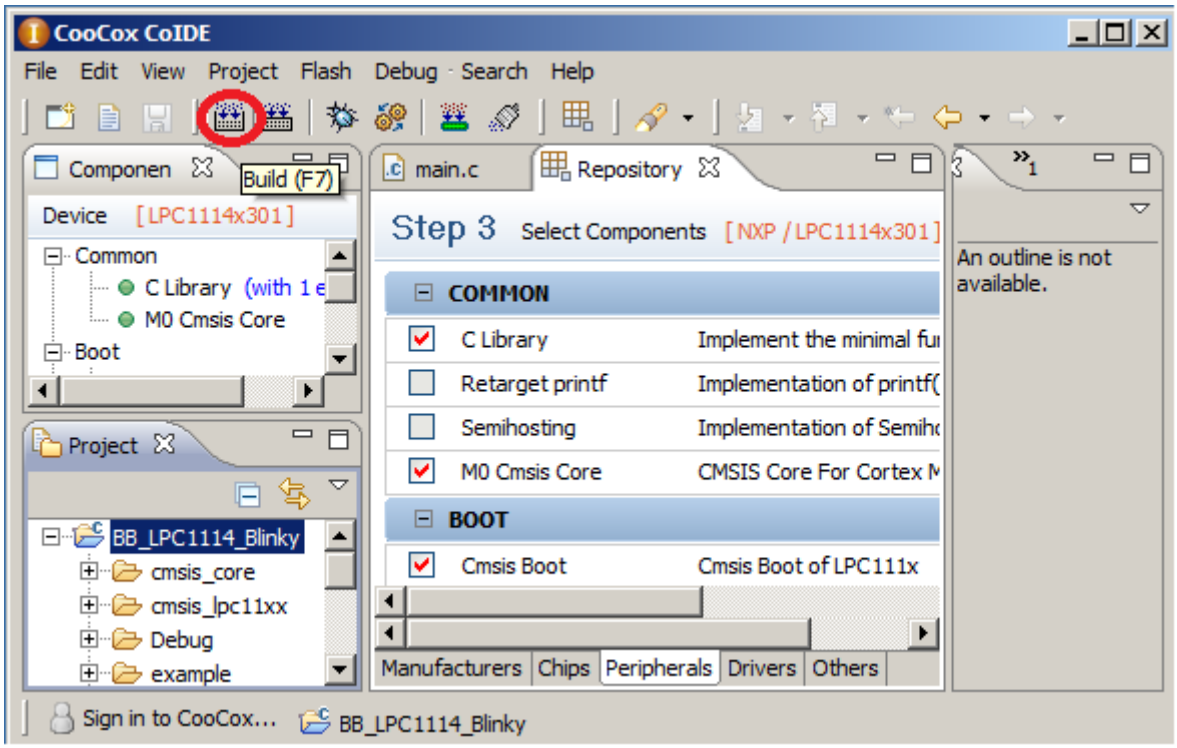

Fig. 26

Step 7: Click on Debug button on the IDE and the project is loaded onto the controller and ready for debugging as shown in below image.

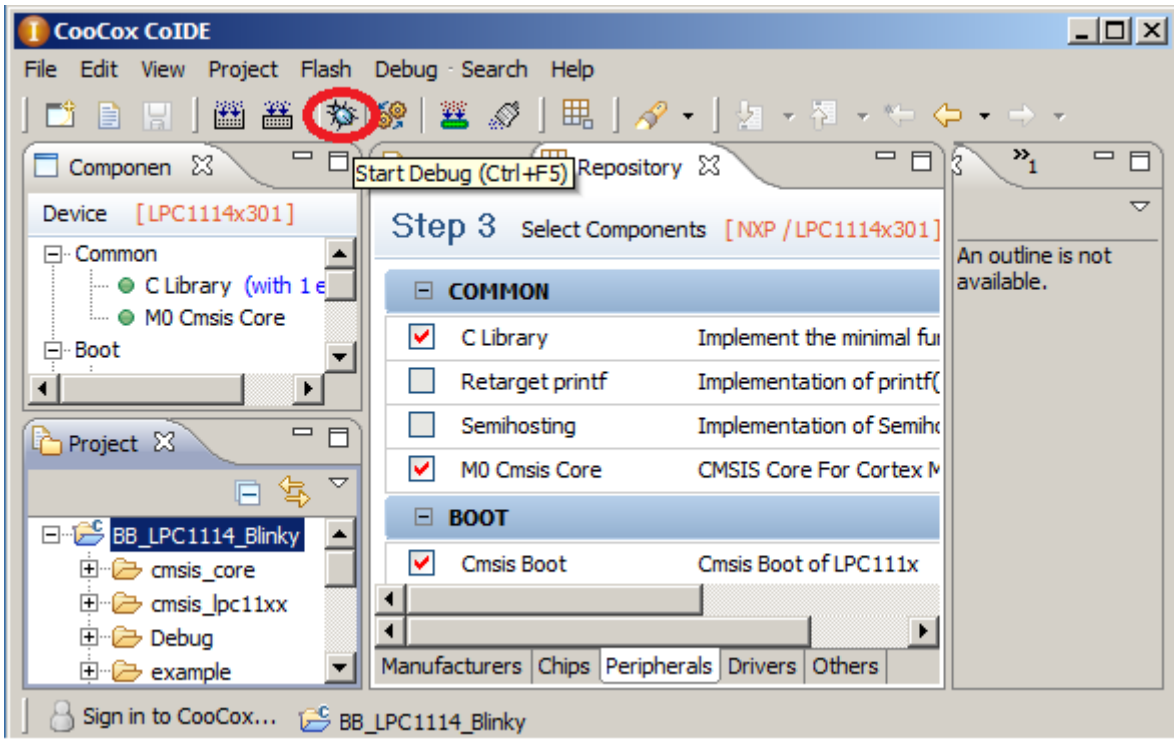

Fig. 27

For getting hex file follow the below steps:

Step 1: Go to CoIDE workspace (project saved location) Open project folder.

Step 2: Open Debug folder in that two folders are there bin and obj folders.

Step 3:Open bin folder in that hex and bin files are there as shown in below image:

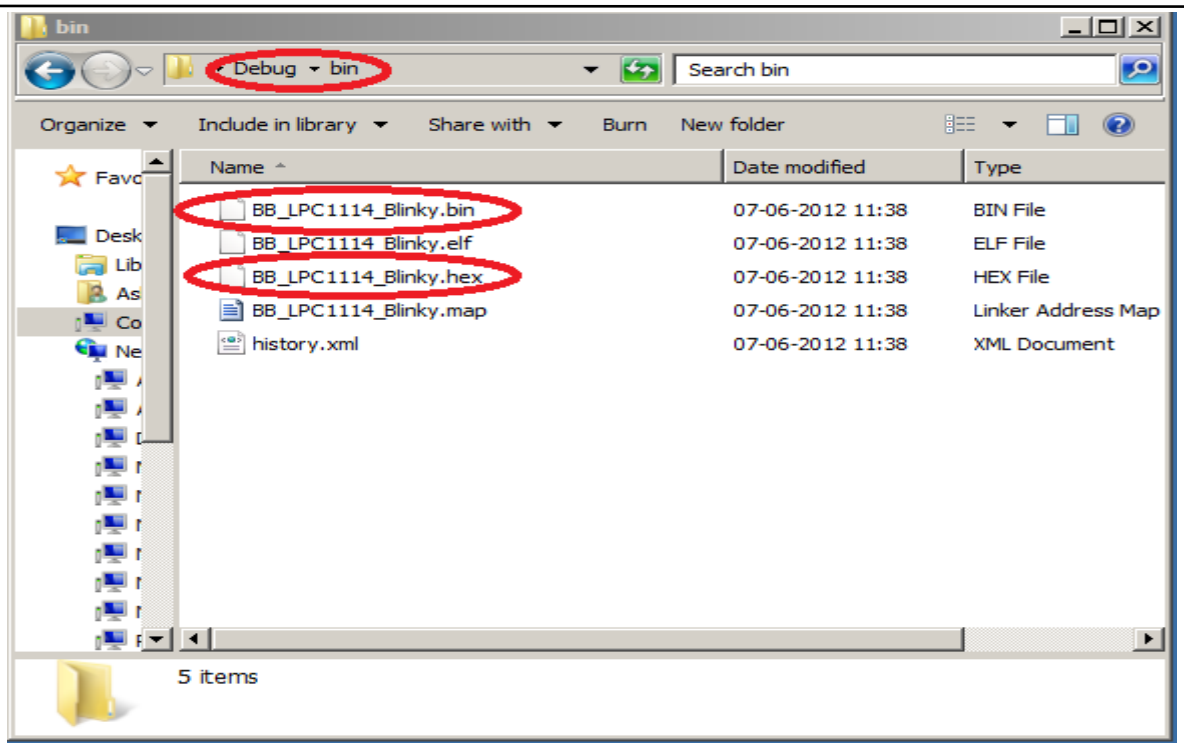

Fig. 28

4.0 BLUEBOARD-LPC1114 Programming

4.1 Programming options

BlueBoard-LPC1114 can be programmed using the

- On-chip bootloader (UART)
- Debugger (NGX CoLink)

4.1.1 On-Chip bootloader (UART)

In order to program the board either through UART we need to get the board under programming mode.

Getting the board in programming mode:

Theory: The On-chip bootloader looks for a logic LOW to be present on a pre-defined PIN (ISP pin) during reset. If the ISP pin is held LOW and reset signal is provided to the MCU, the MCU enters into programming mode.

Practical:
On the BlueBoard-LPC1114 the RESET and ISP signals are connected to buttons provided on the board. Look for the RESET and ISP marking on the board. Therefore to enter into programming mode:

- **Press and hold** the ISP button
- Press the RESET button and release it
- Now release the ISP button
- The board is in the programming mode

4.2 Flashing the Hex file through UART

Step 1: Connect the serial cable to the PC as well as to the board UART and open the flash magic tool.

Step 2: Input all the parameters as shown in below Fig.

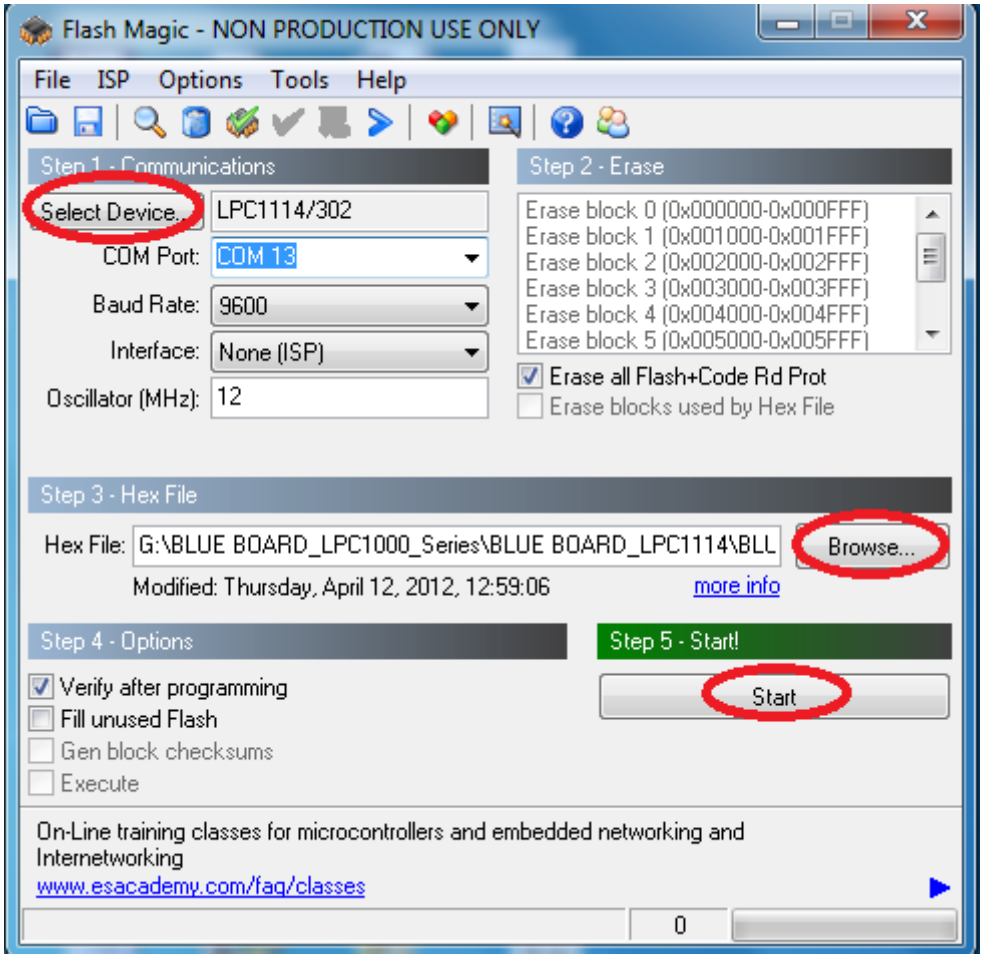

Fig. 29

Step 3: Click **Star**t to flash the hex file. Press Reset to run.

NOTE: Make sure that the Board is not powered through USB.

5.0 Schematic & Board Layout

5.1 Schematic

This manual will be periodically updated, but for the latest documentations please check our website for the latest documents. The Board schematic and sample code are available after the product has been registered on our website.

5.2 Board layout

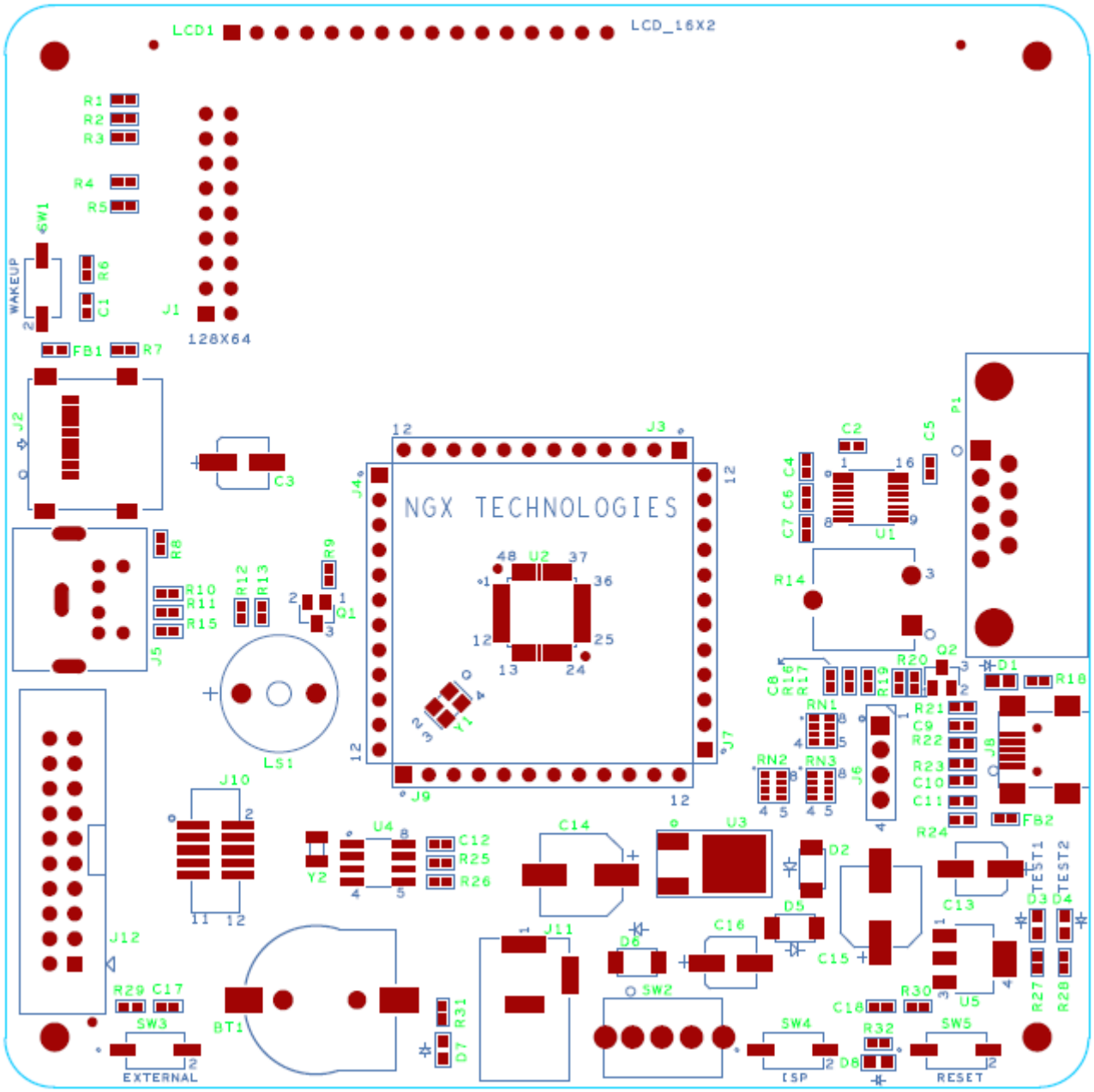

Fig. 30

6.0 CHANGE HISTORY

6.1 Change History

Rev	Changes	Date (dd/mm/yy)	By
1.0	Initial release of the manual	11/07/2012	Dharmanna Gaded

7.0 REFERENCES

In addition to this document, the following references are included on the NGX BLUEBOARD-LPC1114 product and can also be downloaded from www.ngxtechnologies.com:

- NGX BLUEBOARD-LPC1114 schematic for the Development board.

Additional references include:

- Information on development tool being used:
  - CoIDE 1.4.2, http://www.coocox.org/CooCox_CoIDE.htm
  - Flash magic, http://www.flashmagictool.com/

About this document:

Revision History

Version: V1.0 author: Dharmanna Gaded.

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